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Wilson

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[54] **TROLLING MOTOR FOOT CONTROL**

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[21] Appl. No.: **539,118**

[22] Filed: **Oct. 5, 1983**

[51] **Int. Cl.**[3] **B63H 25/00**

[52] **U.S. Cl.** **440/7;** 74/512; 114/153

[58] **Field of Search** 74/478, 478.5, 512; 440/7; 114/153

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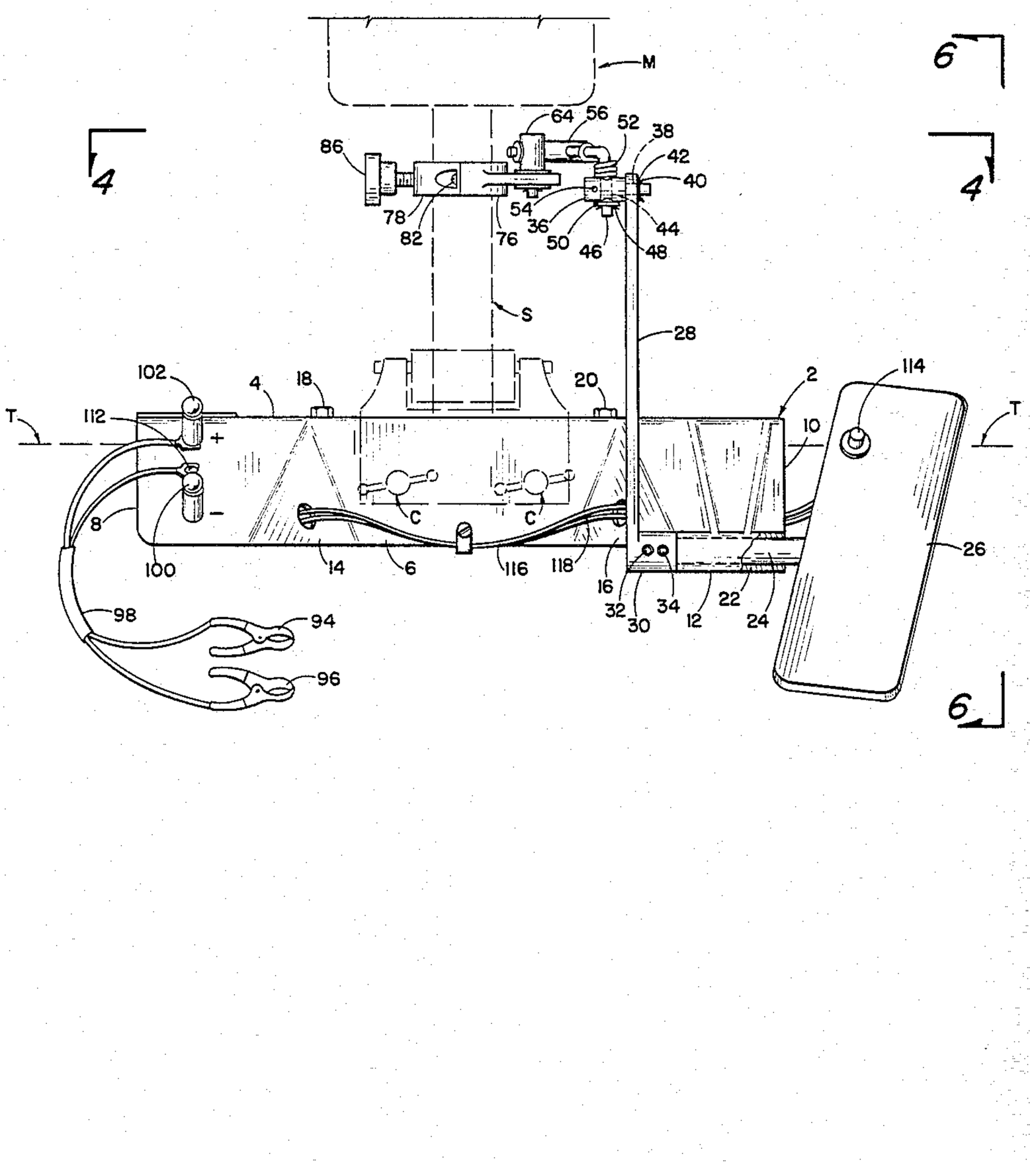
Primary Examiner—Sherman D. Basinger

Attorney, Agent, or Firm—Head, Johnson & Stevenson

[57] **ABSTRACT**

This invention consists of a foot operated trolling motor control assembly that may be either temporarily clamped to, or permanently mounted upon either the fore or aft located boat transom. Rotational steering of the trolling motor is accomplished through the action of a foot operated pedal pivotally driving the lower end of a vertical lever by an interconnecting, horizontal shaft; a spring loaded connecting rod both vertically and horizontally pivoted to the upper end of the vertical lever; and a split collar and horizontal lever assembly clamped upon a vertical, rotatable, trolling motor shaft with the collar's horizontal lever portion attached to the spring loaded connecting rod through both horizontal and vertical pivots at the rod end opposite the vertical lever mounting. Split bushings may be used within the bore of the split collar assembly in order to accommodate various trolling motor shaft diameters. An auxiliary trolling motor electrical control system is also provided which incorporates a two conductor battery cable, two trolling motor terminals, a foot pedal mounted momentary contact electrical switch, and necessary wiring to provide for the activating of the electrical trolling motor by conveniently pressing the momentary contact switch with the foot when so desired.

3 Claims, 9 Drawing Figures



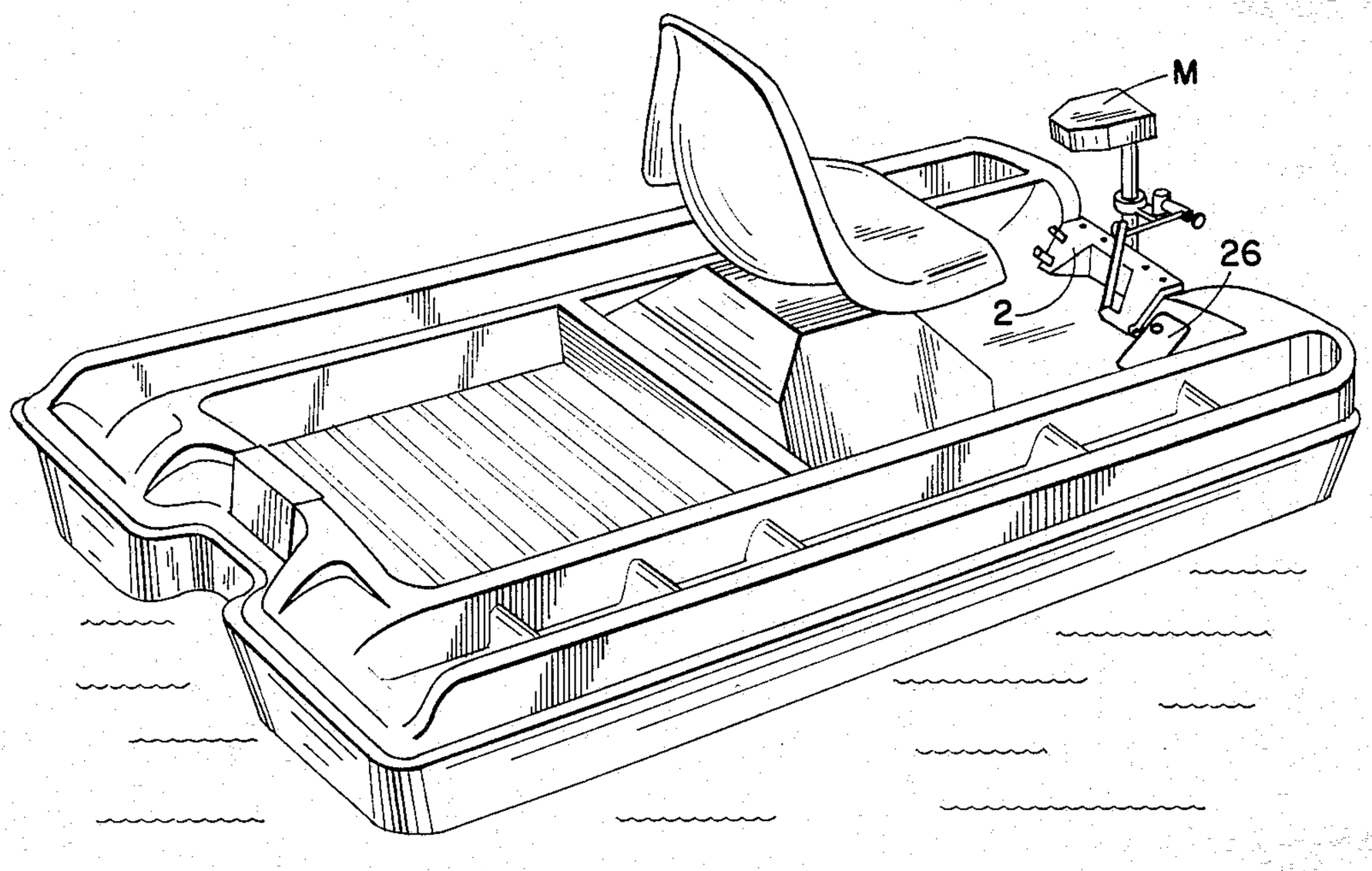


Fig. 1

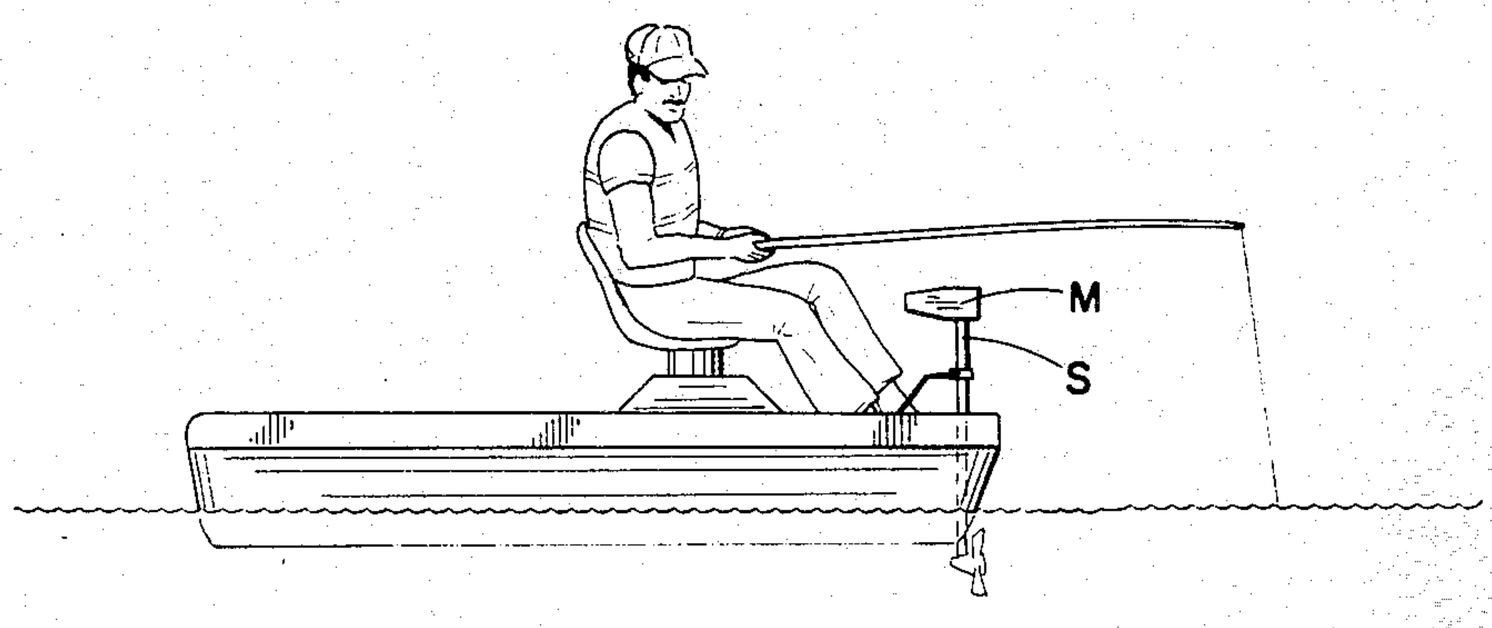
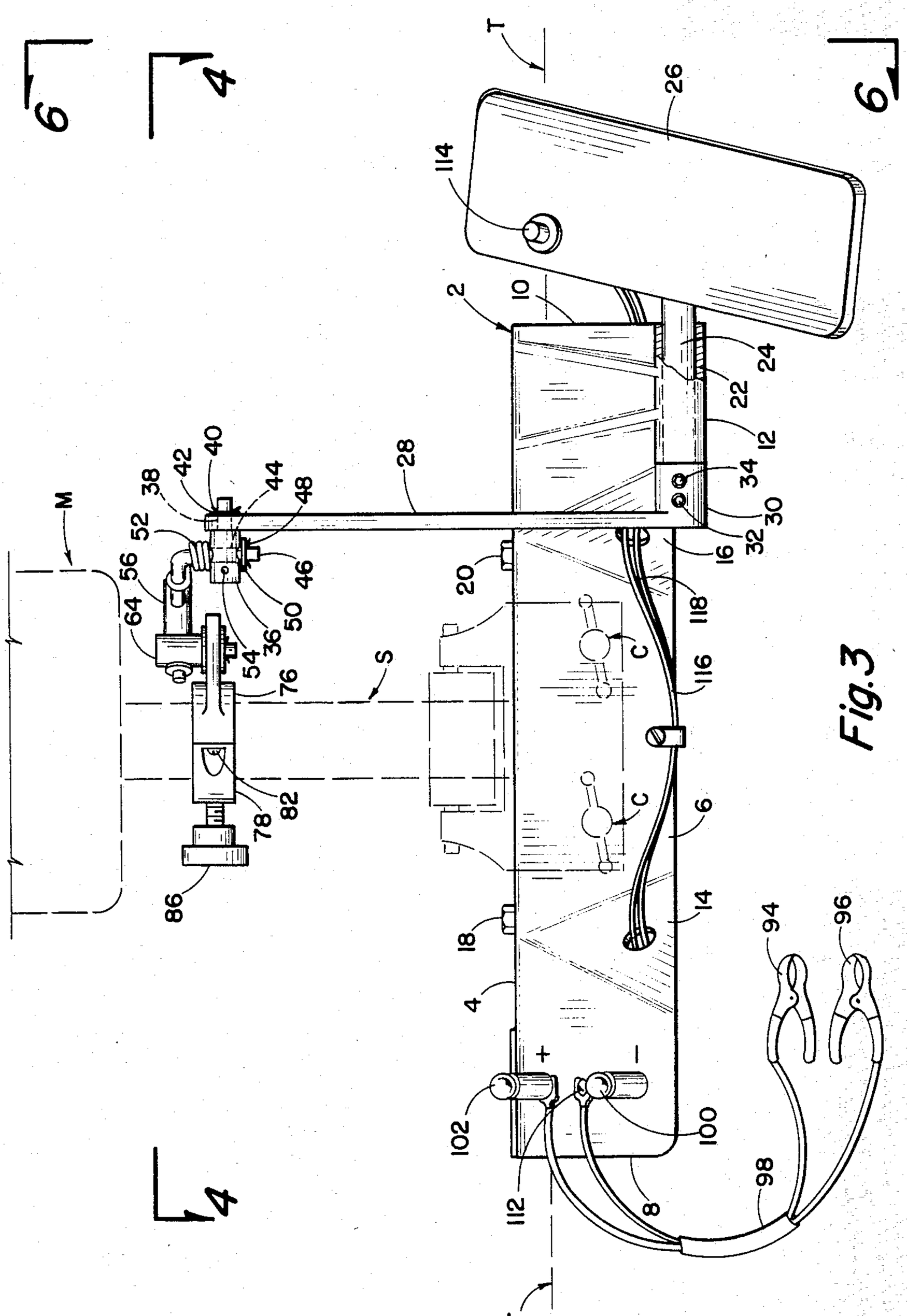


Fig. 2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46
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36
54
76
64
56
M
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86
78
82
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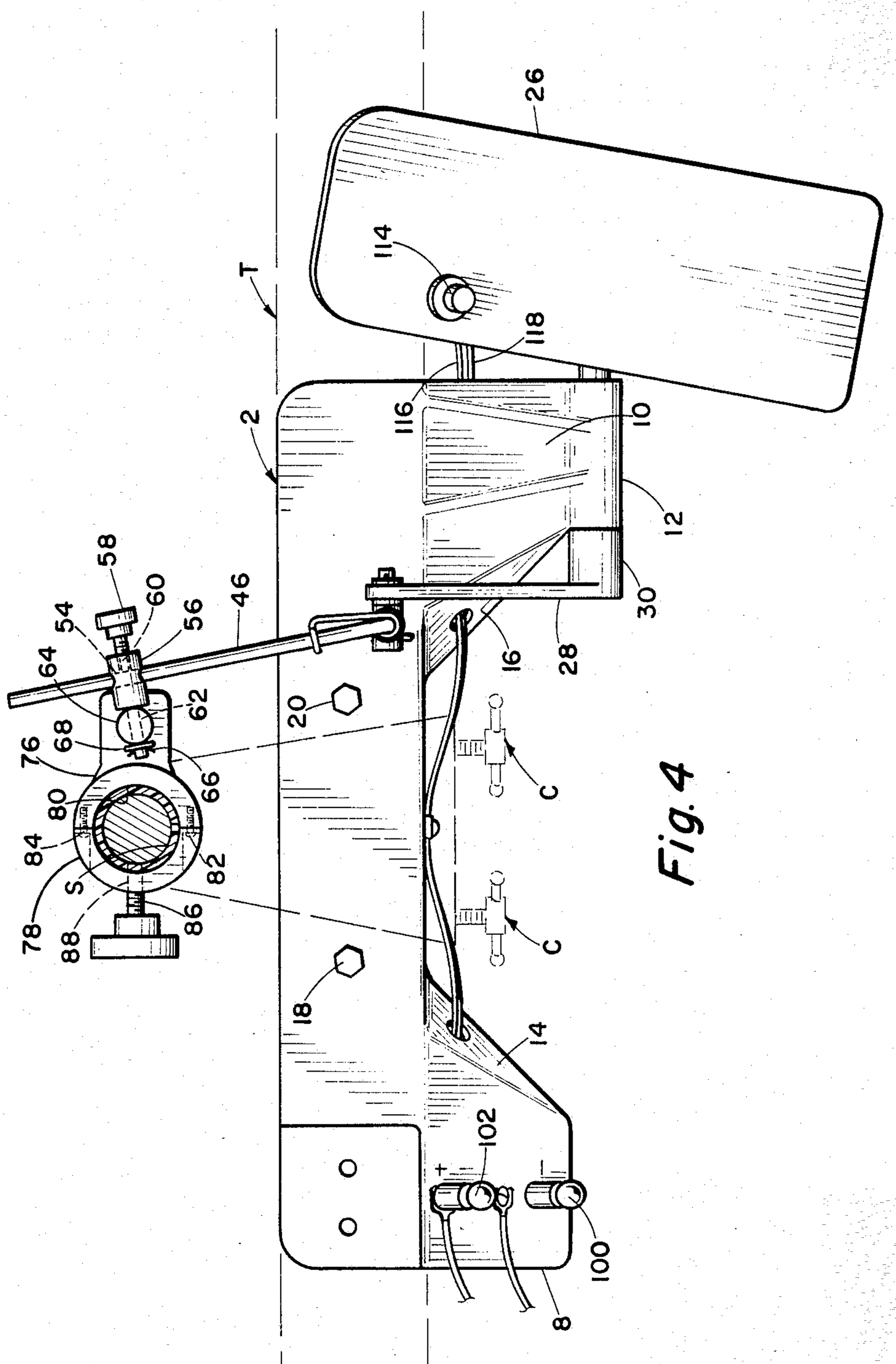
102
100
112
8
98
T

Fig. 3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S
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86
C
C
18
14
102
100
8

Fig. 4

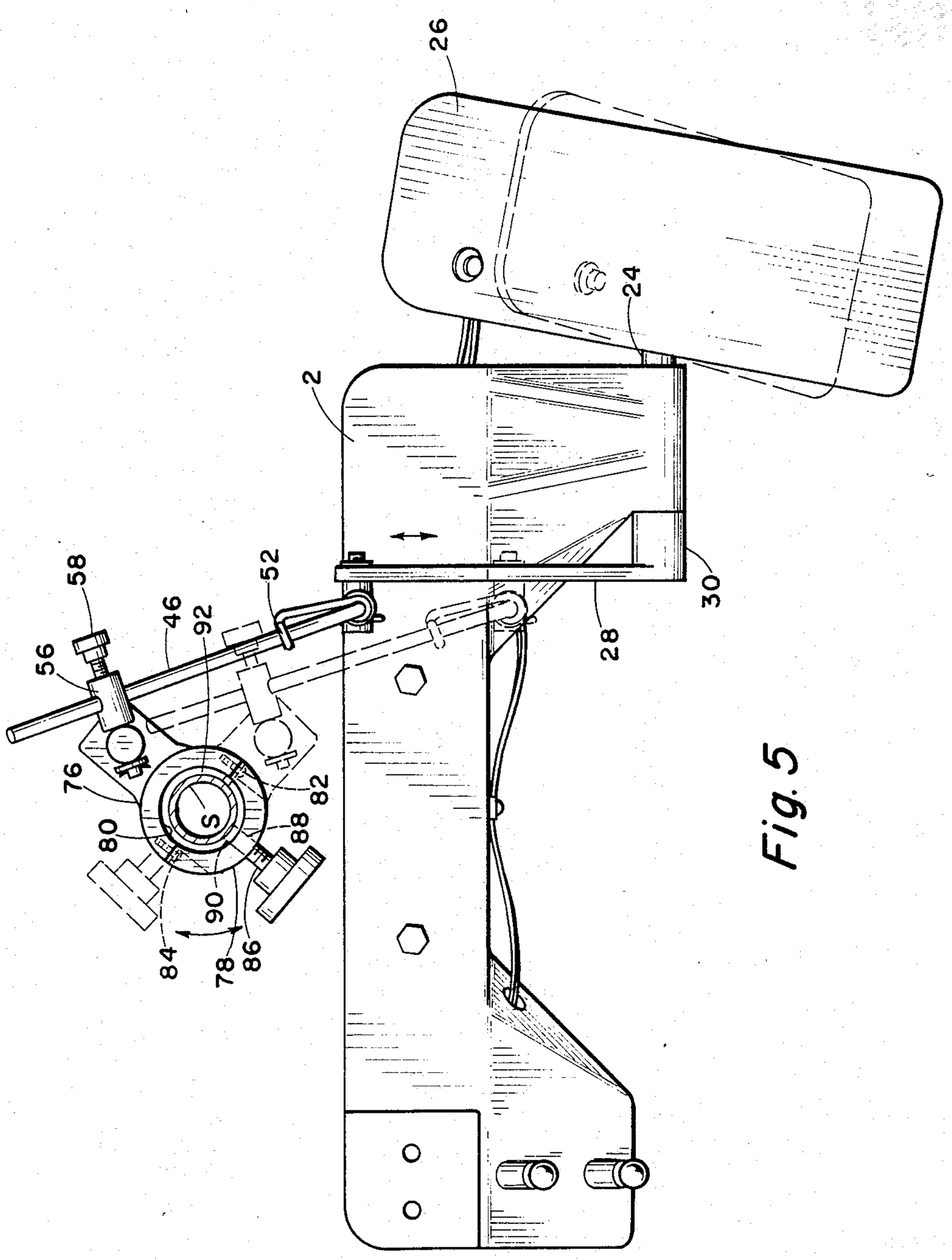
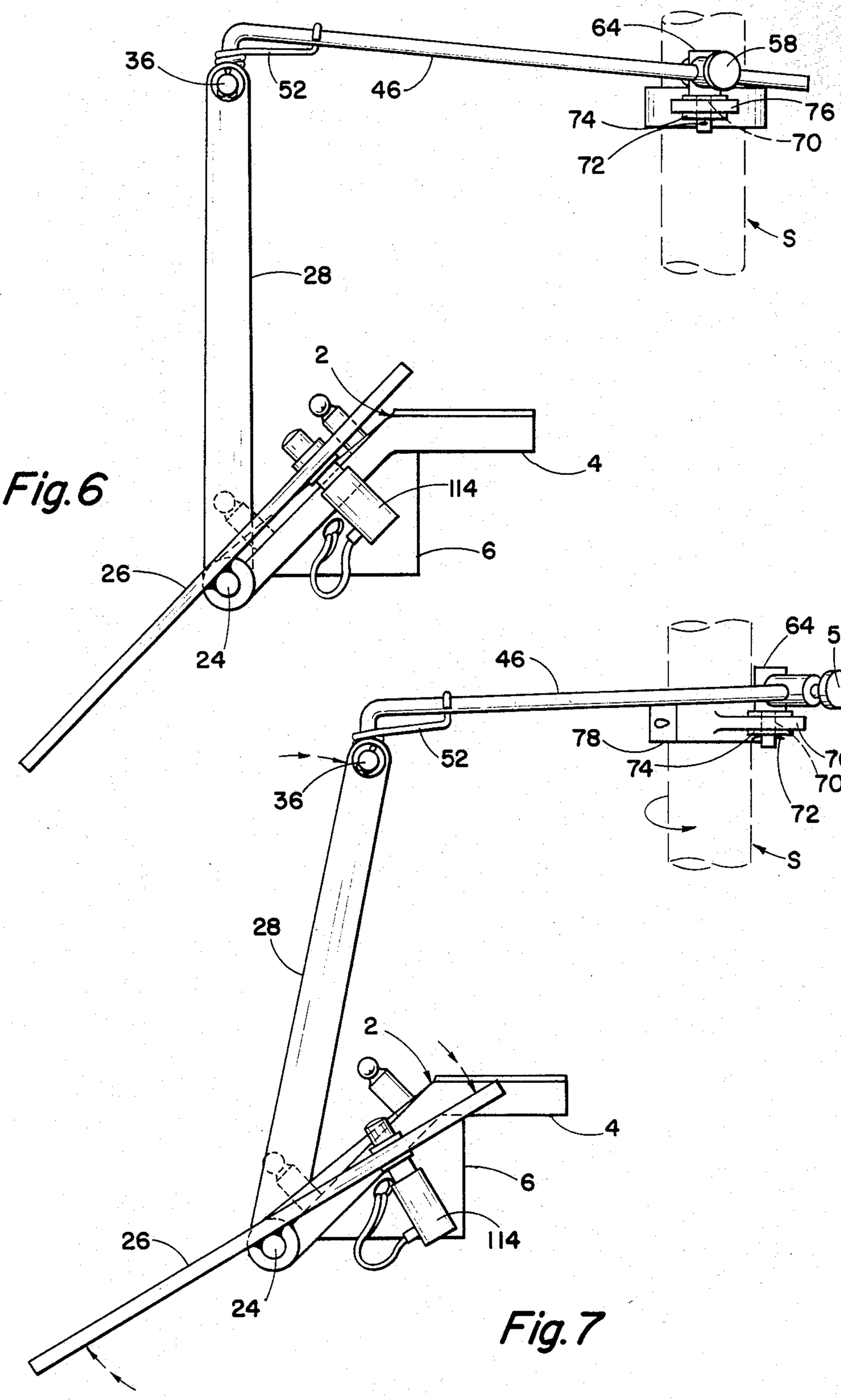


Fig. 5


64
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52
46
74
76
72
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Fig. 6

Fig. 7

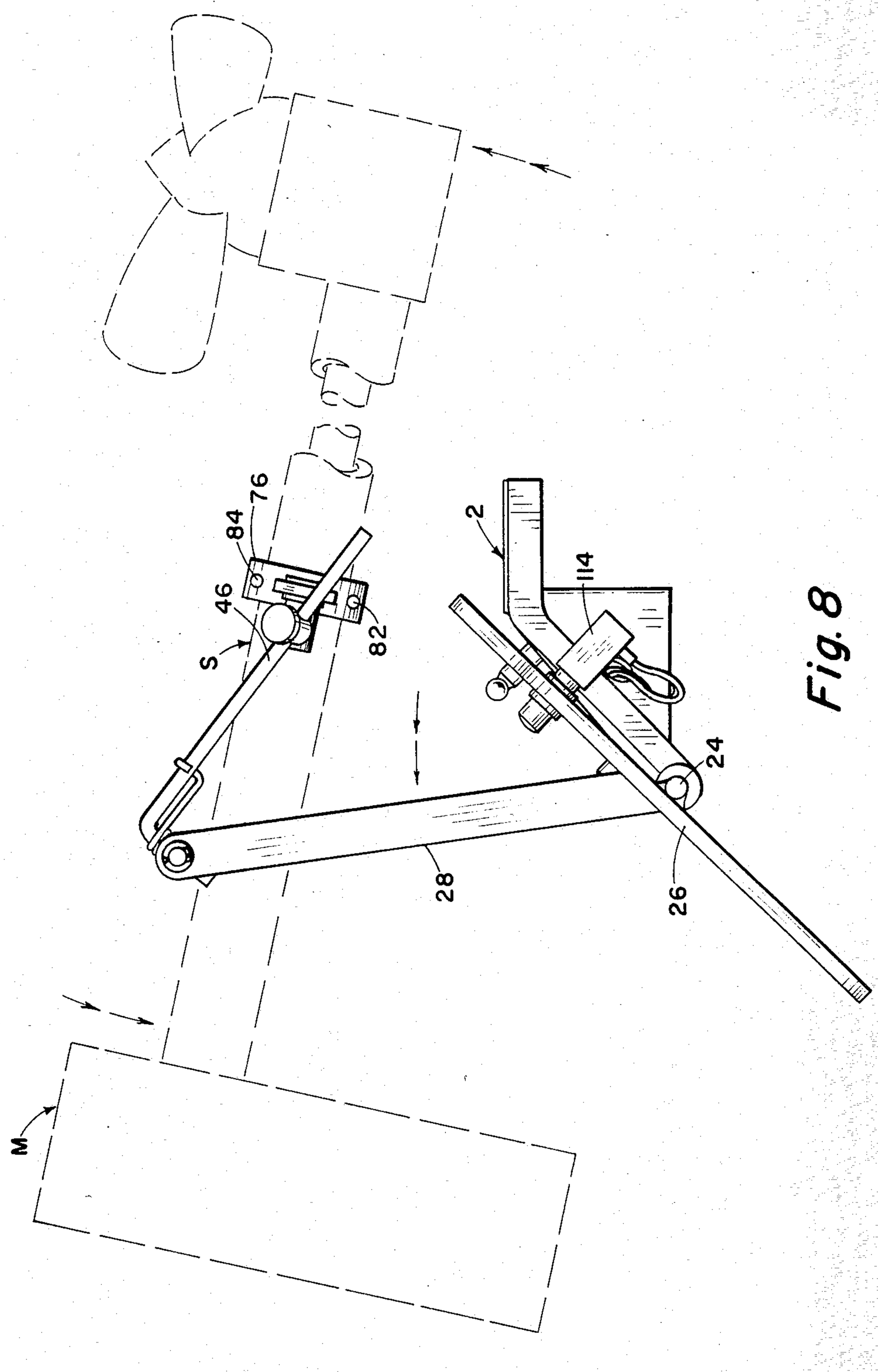

Fig. 8

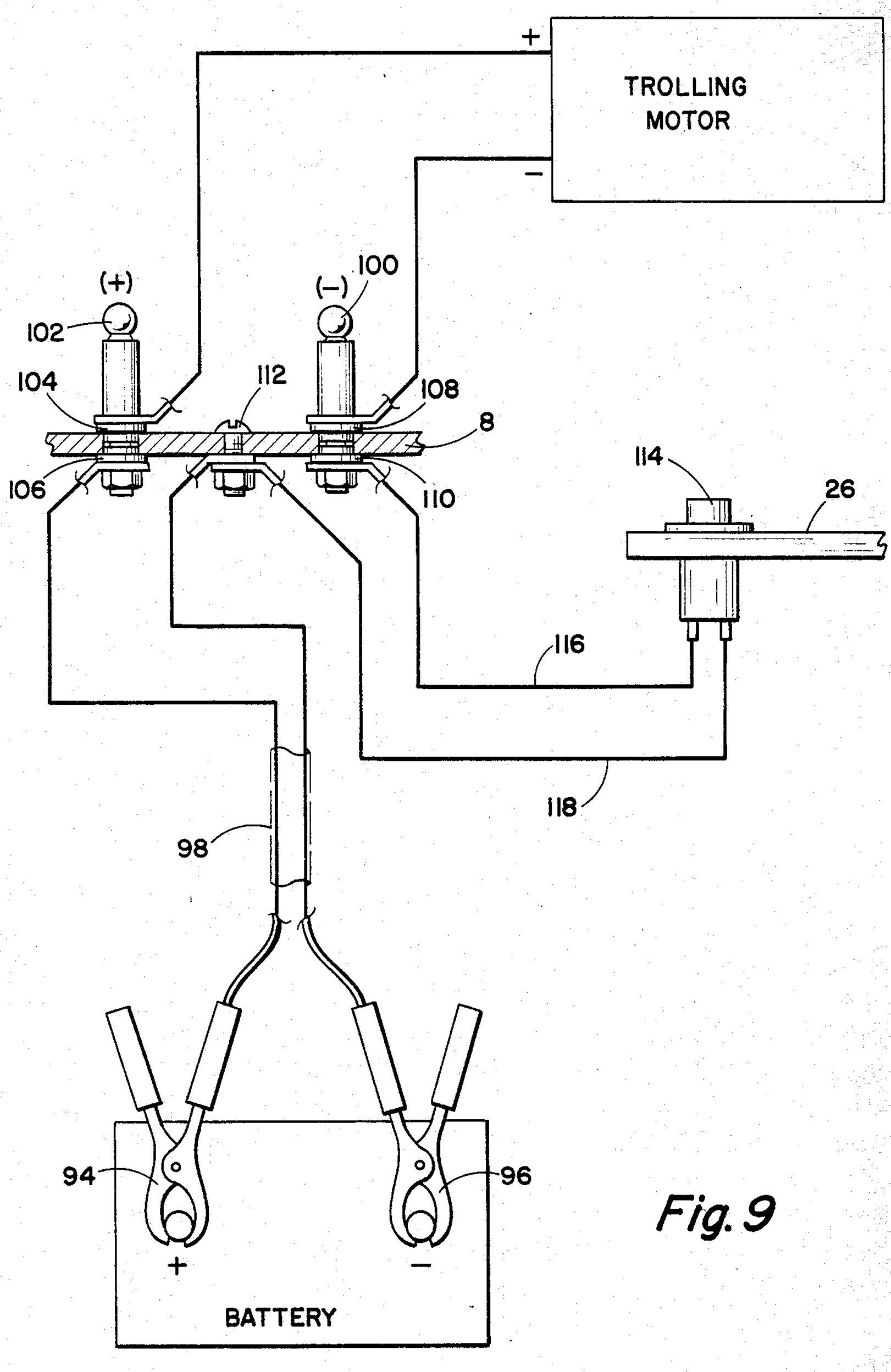
+
TROLLING MOTOR
−
(+)
(−)
100
102
104
112
108
8
106
110
114
26
116
118
98
94
96
+
−
BATTERY

Fig. 9

TROLLING MOTOR FOOT CONTROL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to improvements in steering control devices and more particularly, but not by way of limitation, to a foot actuated control means for both the steering and actuation of a trolling motor, or the like, used on relatively small boats.

2. Description of the Prior Art

Users of small one, two or three man plastic, fiberglass, or metal mini-boats typically use a hand operated, vertical shaft, battery operated, electric trolling motor for propelling their boat. This trolling motor is usually clamped upon either the front or rear transom of the boat and is manually steered by hand. Activation of the electrical portion of the trolling motor is usually accomplished by the use of a hand operated switch affixed to the upper portion of the trolling motor assembly.

Many times it is desirable for the boat operator to have their hands free to uses other than control of the trolling motor, particularly when one is fishing, and in either windy or running water conditions. It is further desirable that any control device for leaving the hands free would be light in weight and also be simple and basic in construction since the boats are generally small and light weight themselves.

Although foot controlled trolling motors are available for larger boats, their size and complexity preclude their use on smaller boats and a definite need exists for a light weight and uncomplicated foot control for use with simple hand operated trolling motors on small boats.

The primary object of this invention is to provide such a simple and light weight control which allows the existing trolling motor to be both steered and electrically actuated by foot action alone, thereby leaving both of the boat operator's hands free for other purposes.

SUMMARY OF THE INVENTION

The invention comprises a foot operated trolling motor control assembly that may be either temporarily clamped to, or permanently mounted upon, either the fore or aft located boat transom. Rotational steering of the trolling motor is accomplished through the action of a foot operated pedal pivotally driving the lower end of a vertical lever by means of an interconnecting, horizontally mounted, pivotal shaft; a spring loaded, horizontal, connecting rod both vertically and horizontally pivoted to the upper end of the vertical lever; and split collar and horizontal lever assembly clamped upon a vertical, rotatable, trolling motor shaft with the horizontal lever portion attached to the spring loaded connecting rod through both horizontal and vertical pivots at the rod end opposite the spring and vertical lever mounting. Split bushings may be used within the bore of the split collar and horizontal lever assembly in order to accommodate various trolling motor shaft diameters. A trolling motor electrical control system is also provided which incorporates a two conductor battery cable, two trolling motor terminals, a foot pedal mounted momentary contact electrical switch, and necessary wiring to provide a means of activating the electrical trolling motor by means of conveniently pressing the momentary contact switch with the foot when so desired.

The principles of the invention will be further discussed with reference to the drawings wherein a preferred embodiment is shown. The specifics illustrated in the drawings are intended to exemplify, rather than limit, aspects of the invention as defined in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a pictorial view of the invention mounted upon the front transom of a small boat equipped with an electrical trolling motor.

FIG. **2** is a pictorial view of the invention being controlled by the foot of a typical fisherman.

FIG. **3** is an elevational view of the invention as seen from inside the boat with the trolling motor shown in straight ahead position.

FIG. **4** is a plan view of the invention as seen from the aspect of line **4—4** of FIG. **3** with the trolling motor shown in straight ahead position.

FIG. **5** is a plan view of the invention as seen from the aspect of line **4—4** of FIG. **3** with the trolling motor shown in left turn position and alternately showing the trolling motor in right turn position.

FIG. **6** is an end elevation view of the invention as seen from the aspect of line **6—6** of FIG. **3** with the trolling motor shown in straight ahead position.

FIG. **7** is an end elevation view of the invention as seen from the aspect of line **6—6** of FIG. **3** with the trolling motor shown in the left turn position.

FIG. **8** is an end elevation view of the invention as seen from the aspect of line **6—6** of FIG. **3** with the trolling motor shown pivoted upward out of the water and the controlling linkage automatically retracted. The existing trolling motor pivot is not shown for purposes of clarity.

FIG. **9** is an electrical schematic illustrating the general circuitry of this invention.

DETAILED DESCRIPTION OF A PRESENTLY PREFERRED EMBODIMENT OF THE INVENTION

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, the illustrated foot control includes an elongated frame member **2** of generally integrated construction consisting of a horizontally overhung top plate **4**, a depending face plate **6**, and angularly extended mounting plate **8**, an angularly extended support plate **10**, a cylindrical shaft support **12**, and two load bearing gussets **14** and **16** as shown in FIGS. **3** and **4**. Frame **2** may be temporarily attached to an existing boat transom T by use of the screw clamps C and C of a typical hand operated trolling motor assembly M with top plate **4** resting upon the uppermost surface of transom T as shown in FIG. **3**. As an alternative, frame **2** may also be permanently mounted upon a boat transom T by means of screws **18** and **20** extending through their respective holes in frame **2** with both screws engaging transom T. Integral with frame **2** and located generally toward the lower right portion of said frame as viewed in FIG. **3** exists a shaft support **12** cylindrical bore **22**, whose axis parallels the longitudinal axis of frame **2**.

A freely rotatable, cylindrical, pivotal shaft **24** is provided which is integral with pedal **26** and which extends through shaft support **12** and interconnects foot pedal **26** with the lower end of vertical lever **28** and its integral collar **30**. Vertical lever **28** and cylindrical collar **30** are both attached to shaft **24** by means of

threaded set screws **32** and **34** extending through collar **30** and pressing upon shaft **24**.

Shouldered pivot **36** is free to rotate about its horizontal, longitudinal, axis with its minor diameter portion extending through hole **38** which is located near the upper end of vertical lever **28**. Pivot **36** is loosely retained in hole **38** by cotter pin **40** and washer **42**. The pivot **36** also incorporates a hole **44** through its major diameter, with said hole's axis being perpendicular to the longitudinal axis of the pivot. Hole **44** retains the vertical portion of connecting rod **46** by means of cotter pin **48** and washer **50** while allowing freedom of rotational motion around the vertical axis portion of connecting rod **46**. An effective freedom of motion is thus established whereby connecting rod **46** may be pivoted both horizontally and vertically with respect to vertical lever **28** by means of shouldered pivot **36**.

One end of torsional spring **52** extends into, and is retained by, a hole **54** existing through the major diameter portion of shouldered pivot **36**; the hole's axis being perpendicular to said pivot's longitudinal axis. Hole **54** is radially located approximately ninety degrees to, but axially offset from, hole **44**. The opposite end of torsional spring **52** extends essentially parallel with, and adjacent to, the horizontal and longitudinal axis of connecting rod **46** with the extreme spring end then curving around, but loosely attached to, the connecting rod **46**. The coiled portion of torsional spring **52** is freely wound around the vertical portion of connecting rod **46** so as to produce a spring loaded, clockwise, rotational thrust upon the connecting rod when viewed from above as in FIG. **4**.

As shown in FIG. **4**, the horizontal portion of connecting rod **46** extends freely through a hole **54** in shouldered pivot **56**; the hole's axis being perpendicular to the longitudinal axis of said pivot with the location of hole **54** being approximately midway along the length of the major diameter portion of pivot **56**. Thumbscrew **58**, whose thread axis **60** coincides with the longitudinal axis of shouldered pivot **56**, is used to clamp the horizontal portion of connecting rod **46** to pivot **56**, but which also allows freedom of removal or of adjustment in the engagement length between connecting rod **46** and shouldered pivot **56**. The minor diameter portion of shouldered pivot **56** extends through a cross-hole **62** located approximately midway along the major diameter portion of shouldered pivot **64**; pivot **56** being retained by cotter pin **66** and washer **68** so as to allow freedom of rotation about the horizontal, longitudinal, axis of pivot **56**.

As shown in FIGS. **6** and **7**, the minor diameter portion of shouldered pivot **64** extends vertically through a hole **70** in the lever arm portion of collar segment **76** so as to allow freedom of rotation about the pivot's vertical, longitudinal, axis; pivot **64** being retained by cotter pin **72** and washer **74**. A combination now exists at each end of connecting rod **46** whereby both free vertical and free horizontal pivotal motion may exist.

Segments **76** and **78** constitute a collar assembly which is generally cylindrical in nature, with a lever arm integral with one of the collar's two mating segments **76**. As shown in FIG. **4**, collar assembly **76** and **78** is furnished with a bore **80** which is sufficient in size to be installed upon trolling motor shaft S by means of machine screws **82** and **84** securing the two mating segments of collar assembly **76** and **78** together, but with the condition existing whereby the collar assembly remains free to rotate upon trolling motor shaft S until adjustment knob screw **86** is tightened against said shaft thus binding collar assembly **76** and **78** to shaft S.

As shown in FIG. **5** adjustment knob screw **86** extends through its mating threaded hole **88**, and into bore **80**. The axis of threaded hole **88** is located approximately midway both axially and radially in semicircular collar segment **78** and is perpendicular with the axis of bore **80**. Screw **86** has sufficient thread extension to extend through hole **90** and bear against trolling motor shaft S in the event cylindrical split bushing **92** is axially inserted into bore **80** for the purpose of accommodating a trolling motor shaft S of smaller diameter than that of bore **80**.

Collar segment **76** is furnished with an integral lever arm which is located approximately midway both axially and radially upon the semicircular portion of collar segment **76** with the lever extending laterally outward and on a horizontal plane perpendicular to the vertical axis of bore **80**.

The electrical system of this invention includes battery clamps **94** and **96** attached to the outermost ends of each of the two insulated conductors comprising power cable **98**; two electrically conductive terminals **100** and **102** both of which are electrically insulated from frame member **2** by non-conductive washers **104, 106, 108**, and **110**; an electrically conductive grounding screw **112**; a normally open, momentary contact, push button switch **114**; and insulated connecting wires **116**, and **118**. As shown in the electrical schematic FIG. **9**, the circuit from a conventional storage battery attached to cable clamp **94** is continuous to terminal **102**, but the circuit from cable clamp **96** is normally open to terminal **100** until the circuit is closed by the activation of momentary contact switch **114**.

In use and operation, frame **2** is clamped upon boat transom T by utilizing trolling motor clamps C and C as shown in FIG. **3**. Collar segments **76** and **78** are installed upon trolling motor shaft S by use of screws **82** and **84**, and with said collar segments located in the approximate position as that shown in FIG. **4**, adjustment knob screw **86** is tightened against shaft S. The horizontal portion of connecting rod **46** is then inserted through hole **54** for a distance which provides the most comfortable operating angle of foot pedal **26**, and thumbscrew **58** is tightened to secure this setting. Battery clamps **94** and **96** are then attached to the posts of a conventional storage battery and existing trolling motor battery clamps are attached to terminals **100** and **102** with proper polarity being observed. Since a continuous circuit exists between battery clamp **94** and terminal **102**, electrical activation of trolling motor M may now be accomplished by merely pressing switch **114** with the foot, thereby closing the open circuit between battery clamp **96** and terminal **100**.

To effect steering of trolling motor shaft S the operator now presses his foot upon either the upper or lower portion of pedal **26**, thereby causing the upper end of vertical lever **28** to swing either forward or rearward due to the interconnection of pedal **26** and its attached pivot shaft **24** with vertical lever **28** and its integral collar **30**. As vertical lever **28** swings either forward or rearward, longitudinal thrust is applied to connecting rod **46** through connecting pivot **36** and said longitudinal thrust is transferred as either clockwise or counterclockwise rotational torque to the lever arm portion of collar segment **76** and attached collar segment **78**, which are clamped as an assembly to trolling motor shaft S as shown in FIG. **5**. An equal degree of both

right and left hand rotational steering of shaft S may be obtained by the loosening of adjustment knob screw **86** and rotationally positioning collar segments **76** and **78** to the preferred location upon shaft S, and then re-tightening screw **86**.

Since vertical lever **28** swings in an arc about the axis of pivot shaft **24**, and since the lever arm portion of segment **76** swings in an arc about the axis of trolling motor shaft S, each end of connecting rod **46** must be free to pivot or swivel in both horizontal and vertical planes. Shouldered pivot **36** allows such freedom of motion between connecting rod **46** and vertical lever **28**, and shouldered pivots **56** and **64** allow such freedom of motion between connecting rod **46** and the lever arm portion of the collar segment **76**.

The purpose of torsional spring **52** is to apply a side force against connecting rod **46**; said force being perpendicular to, and laterally away from, the vertical axis of trolling motor shaft S, with such force being applied against shouldered pivot **64** by means of its interconnection with connecting rod **46** through pivot **56**. Said force, applied against pivot **64** in such described direction, is to assist the return of trolling motor shaft S to its straight ahead position upon completion of either right or left hand steering maneuvers.

During operation of this invention, it is occasionally desirable to tilt the trolling motor assembly from the water in order to clear underwater obstructions. As shown in FIG. **8**, such tilting can be easily accomplished without binding or other interference from the previously described steering mechanism since there exists freedom of motion in both horizontal and vertical planes at each end of connecting rod **46**, and since vertical lever **28** and foot pedal **26** are free to pivot rearward upon pivotal shaft **24**. The existing trolling pivot motor is not shown in FIG. **8** for purposes of clarity.

Although there has been shown and described herein a preferred form of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. Steering and operating control means for a water craft provided with a trolling motor having a rotatable support shaft, the control means comprising frame means secured to the water craft, foot pedal means pivotally secured to the frame means, linkage means operably connected between the foot pedal means and the support shaft whereby pivoting of the foot pedal means in one direction rotates the support shaft in one direction for turning of the trolling motor in one direction and pivoting of the pedal means in another direction rotates the support shaft in another direction for turning of the trolling motor in another direction to effect the steering of the water craft, power means operably connected between the foot pedal means and the trolling motor whereby activation of the trolling motor may be selectively controlled by the foot pedal means, the power means comprising electrical terminal means operably connected with a power source, switch means secured to the foot pedal means and electrically connected with the electrical terminal means whereby depression of the switch means activates the trolling motor and release of the switch means deactivates the trolling motor, and wherein the linkage means comprises first substantially horizontally disposed pivotal shaft means secured to the foot pedal means, substantially vertically disposed arm means having one end pivotally secured to the first pivot shaft means for angular orientation thereof upon pivoting of the foot pedal means, second substantially horizontally disposed pivot shaft means operably secured at the opposite end of the arm means and between the arm means and the support shaft whereby angular orientation of the arm means in one direction rotates the support shaft in one direction and angular orientation of the arm means in another direction rotates the support shaft in another direction, and yieldable means secured between the second pivot shaft means and the arm means for substantially continuously urging the arm means toward a normal neutral position therefor to provide a normal forward movement of the water craft, the rotation of the support shaft in said one direction moving the trolling motor for causing a left hand direction of movement for the water craft and the rotation of the support shaft in said another direction moving the trolling motor to cause a right hand direction of movement for the water craft.

2. Steering and operating control means as set forth in claim **1** and including means for removably securing the frame means to the water craft.

3. Steering and operating control means as set forth in claim **1** and including means for permanently securing the frame means to the water craft.

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